

Levels of Testing and Functional Testing types

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- Each level of testing in software development is like creating a pizza step by step, ensuring every layer and combination works perfectly before presenting it to the customer.



Introduction

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Software testing is a process of testing software to ensure that the product is delivered bug-free to the customer. Levels of software testing ensure that no component is left without testing

- **There are four levels of testing:**
- Unit/component testing
- Integration testing
- System testing
- Acceptance testing

Levels of Testing:

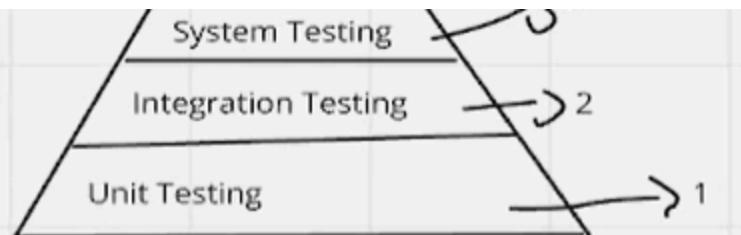
- Unit Testing: Testing individual components or functions.
- Integration Testing: Ensuring that combined components interact correctly.
- System Testing: Testing the complete system as a whole.
- Acceptance Testing: Validating if the system meets user needs.

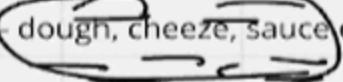
It is also known as **unit, module, and program testing**. This is the first level of testing, where a component or unit of a software or product is tested. It checks for the defects and then verifies the functionality of the product.

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tled : |  Upgrade



Pizza 

Components - Text field, text area,
radio button, checkbox etc

Password:

Requirements -

- 1) It should accept alphabets,
numbers only
- 2) acceptance range is between 8 to
16 characters only
- 3) Spl characters not allowed

Components - Text field, text area,
radio button, checkbox etc

Password:

Requirements -

- 1) It should accept alphabets,
numbers only
- 2) acceptance range is between 8 to
16 characters only
- 3) Spl characters not allowed

1) To verify password text field accepts 8 characters with combination of
alphabets & numbers. (Test data - Shiva123).

When performing testing, if above data is accepted, positive component testing is
passed, if not accepted, we say positive component testing is failed

2) To verify password text field accepts 16 characters with combination of
alphabets & numbers. (Test data - Shivakumar123456)

- When performing testing, if above data is accepted, positive component testing is
passed, if not accepted, we say positive component testing is failed.

3) To verify password text field accepts special characters along with 5 alphabets.
(Test data - shiva@)

When performing testing, if above data is accepted, negative component testing
is fail, if not accepted, negative component testing is pass

Advantage of component testing

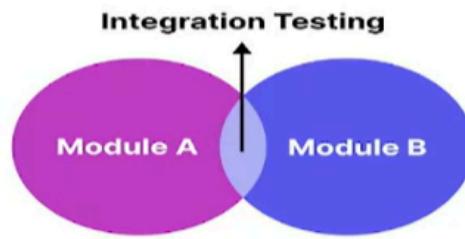
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- Since testing is focused on components, making changes in a small component is easier than making changes in the later stages.

Integration testing

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- integration testing tests the interfaces between components or units. The goal behind this testing is to ensure that the interface is bug-free when combined and the software is working fine.



- Let's understand the integration testing with the help of amazon website.

- Sign in/register page:** After signing-in or registering my account on amazon, I land to the amazon home page. The flow from sign-in/register page to the home page is where we do our integration testing.
- Search:** After landing on home page, we will be searching for the book I want to purchase. Search is a module and connection to the next page is the data flow and integration.
 - Product listing page:** When search will be done, the result page shows, this page is called the product listing page. Whether the products shown are according to the search or not, this is where we are going to do our testing.

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Product details page: When I am clicking a specific book of my choice, it leads me to the product details page where I can find the description of the book, ratings & reviews of the book, and price etc.

Cart: I put the book of my choice into the cart and proceed to checkout.

Checkout: At the time of the checkout, the address is fetched from "my account" section where I have saved all of my addresses.

Payment: During checkout, the Payment details are populated from the details added in "my payments" section.

Example of integration testing:

Let us assume that we have a **Gmail** application where we perform the integration testing.

First, we will do **functional testing** on the **login page**, which includes the various components such as **username, password, submit, and cancel** button. Then only we can perform integration testing.

Scenarios:

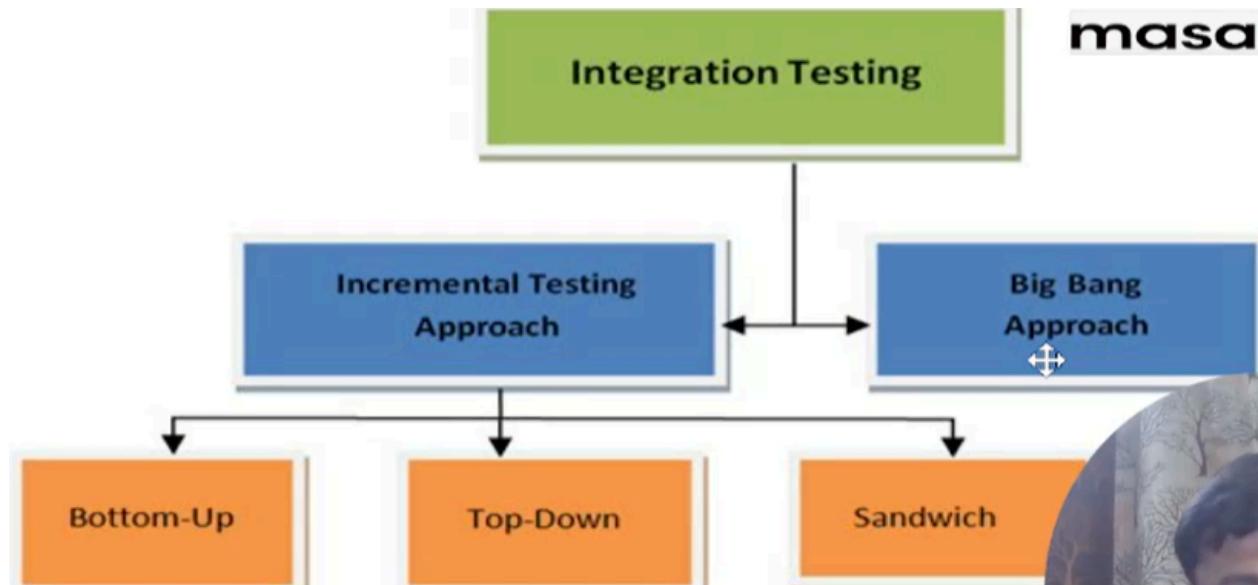
- First, we login as **P** users and click on the **Compose** mail and performing the functional testing for the specific components.
- Now we click on the **Send** and also check for **Save Drafts**.
- After that, we send a **mail** to **Q** and verify in the **Send Items** folder of **P** to check if the send mail is there.
- Now, we will **log out** as **P** and login as **Q** and move to the **Inbox** and verify that if the mail has reached.



Advantages of integration testing

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- Helps to detect the issues related to the interface between modules.
- Helps to stimulate the interaction between various modules.



Top-down testing: The testing is done from top to bottom, following the architectural structure or control flow. Components are substituted by stubs.

Bottom-up testing: This testing tests the lowest module first. The other modules are added one by one moving upwards. Components are substituted by drivers.

Sandwich testing is a combination of Topdown & Bottom up Testing

Big-bang approach

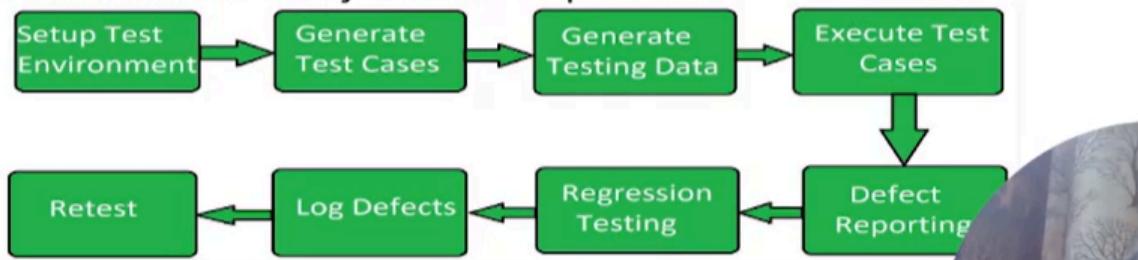
All components or systems are integrated simultaneously; after which everything is tested as a whole. This is called big-bang integration testing. Big bang approach has the **advantage** that everything is finished before integration testing starts.

The major **disadvantage** is that it is time consuming and difficult to trace the cause of the failures with the late integration.

System Testing

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System testing is most often the final test on behalf of development to verify that the system to be delivered meets the specification and its purpose is to find as many defects as possible.



What is the business workflow of whatsapp

- sending messages

System test case - open whatsapp, choose a contact, send a message, then change profile picture, check the status, again send a message to your contact.

Open whatsapp, search for a friend, send a message, delete a message. Close whatsapp, again re-open whatsapp, check the message again.

Happy path - positive flow

Open whatsapp, search for a friend, send a message, block him & then try to send him a message again.

If unable to send a message - negative testing is pass, if message is sent, it is a defect we say negative testing is fail

Customer
business
workflow of
flipkart

Acceptance testing

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- Acceptance testing is most often the responsibility of the user or customer, and the environment required for executing acceptance test cases is almost similar to the production environment.

Acceptance testing can be of several types based on the requirements and the functionality:

- **User acceptance testing** mainly focuses on functionality of the system. User acceptance testing is performed by the users and application managers.
- **Operational acceptance testing** validates whether the system meets requirements for operation.
- **Contract acceptance testing** is performed against a contract's acceptance producing custom-developed software.



Compliance acceptance testing or regulation acceptance testing is performed against the regulations which must be adhered to, such as governmental, legal or safety regulations

When the software is being released for the mass users, feedback is necessary from the users. Alpha and beta testing are performed based on these requirements.

• **Alpha testing** is performed by the people who are members of the Organization and not involved in the development team. It is also called as internal acceptance testing as it tests by its own members.

Beta testing is performed by users who are going to use those in the future. It is also called as external acceptance testing as the outsider user tests it.

Functional Testing

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It is a type of software testing which is used to verify the functionality of the software application, whether the function is working according to the requirement specification. In functional testing, each function tested by giving the value, determining the output, and verifying the actual output with the expected value. Functional testing performed as black-box testing which is presented to confirm that the functionality of an application or system behaves as we are expecting. It is done to verify the functionality of the application.

Goal of functional testing

The purpose of the functional testing is to check the primary entry function, necessarily usable function, the flow of screen GUI. Functional testing displays the error message so that the user can easily navigate throughout the application.

What is the process of functional testing?

- Testers follow the following steps in the functional testing:
 - Tester does verification of the requirement specification in the software application.
- After analysis, the requirement specification tester will make a
- After planning the tests, the tester will design the test case.
- After designing the test, case tester will make a document of the traceability matrix.
- The tester will execute the test case design.
- Analysis of the coverage to examine the covered testing area of the application.
- Defect management should do to manage defect resolving.

Type of Functional Testing Techniques

There are various types of functional Testing which are as follows:

Smoke Testing: Functional testing by smoke testing. Smoke testing includes only the basic (feature) functionality of the system. Smoke testing is known as "**Build Verification Testing.**" Smoke testing aims to ensure that the most important function work. For example, Smoke testing verifies that the application launches successfully will check that GUI is responsive.

Sanity Testing: **Sanity testing** involves the entire high-level business scenario is working correctly. Sanity testing is done to check the functionality/bugs fixed. Sanity testing is little advance than smoke testing.

For example, login is working fine; all the buttons are working correctly; after clicking on the button navigation of the page is done or not.

Regression Testing: This type of testing concentrate to make sure that the code changes should not side effect the existing functionality of the system. Regression testing specifies when bug arises in the system after fixing the bug, regression testing concentrate on that all parts are working or not. Regression testing focuses on is there any impact on the system.

Usability Testing checks how easy a product is to use by having real users try it out. It helps find problems, like confusing features or difficult tasks. The goal is to improve the product so it works better for users and makes them happy. A user manual is created to suggest fixes before the product is launched.